

SUMMARY

4.24 Transporting Spent Fuel

The U.S. Department of Transportation (DOT) and the Nuclear Regulatory Commission (NRC) work together to ensure that the transportation of spent fuel and defense high-level waste is safe. The DOT regulates every aspect of transporting the spent fuel. The NRC sets standards for the design and performance of the casks that carry the spent fuel during transport. The Department of Energy will follow these agencies' standards and regulations in shipments of nuclear waste to a repository or storage facility.

Transportation Casks

Casks are designed to contain spent fuel rods during shipment and to shield transportation workers, the public, and the environment from radiation under normal and extreme transport conditions. To ensure the ability of casks to contain their radioactive contents, computer modeling, as well as scale model and full-scale tests are performed on the casks. These tests simulate severe accident situations. During testing, casks have suffered only minor damages and have not released their simulated "radioactive" contents.

Shipments of high-level nuclear waste must follow preferred routes. States receive advance notice of any shipments. In addition, public safety officials are trained in procedures for routine transportation and for emergency response to accidents.

4.25 The Geologic Repository

The United States plans to dispose of spent fuel and high-level radioactive waste in a geologic repository deep beneath the surface of the earth. The Environmental Protection Agency (EPA) has developed standards for isolating the waste from the environment for 10,000 years after disposal. The NRC is

What are the U.S. Department of Transportation's responsibilities for transporting nuclear waste?

Why is spent fuel shipped in casks?

How does the U.S. propose to dispose of spent fuel and high-level radioactive waste?

What are the multiple barriers that will block radionuclide transport after disposal?

responsible for enforcing the EPA standards. Both agencies require the use of a system of multiple barriers to isolate the waste.

Multiple Barriers

Before disposal, the waste must be in a solid form. This form will inhibit the release of radioactivity. The waste will be packaged in metal containers that will be designed to isolate the waste from the host rock. Borehole and shaft seals will be used to reduce water migration to the waste container. The repository itself will act as a barrier to waste movement. Underground ramps and shafts will be backfilled to reduce the possibility of ground water access to the waste package, support the overlying host rock, decrease stress on the waste package, and transfer heat from the waste package to the surrounding rock. Features of the host rock, such as its response to heat and water, may act as part of the multiple barrier system to limit movement of waste.

What Will the Repository Look Like?

On the surface the repository will look like a large mining complex. There will be surface facilities for handling the waste, which will be connected to the subsurface disposal facility by ramps. Following the closing of the repository, measures will be taken to alert future generations to the location and hazards of the repository.

What site is currently being studied for the high-level nuclear waste repository?

No repository site has been selected, but studies have begun to determine the suitability of Yucca Mountain, Nevada. In 1987, the United States Congress directed the U.S. Department of Energy to study this site, which is located about 161 kilometers (100 miles) northwest of Las Vegas. Characteristics of the host rock, the chemistry of the site, and the flow of ground water will all be important in deciding if the site is suitable.